This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims

Claim 1. (Currently Amended) A method of writing data in a 3-bit, 0-1-2 ternary encoding scheme for WORM (Write Once Read Many Times) optical data storage on a compact disc (CD) or digital video disc (DVD) with two-photon fluorescent readout comprising the steps of:

(h) providing a data storage medium composed of a transparent polymer selected from at least one of polystyrene, polymethylmethacrylate (PMMA) and polycarbonate, impregnated with a photo-acid generator and a stable reactive fluorene dye;

(i) focusing a near infrared tunable Ti:Sapphire laser beam into the data storage medium with high intensity short pulses of 730 nm wavelength laser light causing the photo-acid generator to absorb the high intensity short pulses, undergo two-photon absorption and generate a proton ion (H^+) that is donated to the reactive fluorene dye; and

(j) forming a stable balanced ion pair with the negative counter-ion from the photo-acid generator and the positive ion of the reactive fluorene dye wherein the stable ion pair forms a data storage voxel (volume pixel) encoding data in a 0-1-2 ternary (3-bit) data encoding scheme to achieve high data storage densities ~~into~~ in the data storage medium.

Claim 2. (Currently Amended) A method of reading data from a 3-bit, 0-1-2 ternary encoding scheme for WORM (Write Once Read Many Times) optical data storage on a compact disc (CD) or digital video disc (DVD) with two-photon fluorescent encoded data comprising the steps of:

(k) providing a data storage voxel (volume pixel) with 0-1-2 ternary (3-bit) encoded data in a data storage medium containing a photo-acid generator (PAG), ~~and~~ a reactive fluorene dye (RD), and a protonated fluorene dye, the fluorescence emitter (FE);

(l) exciting the fluorescence of the reactive fluorene dye (RD) and protonated fluorene dye (FE) in the data storage medium with a two-photon infrared laser light pulse of approximately 10μs and an approximately 800 nm wavelength laser light ~~plurality of light sources~~ to generate fluorescent output signals for the reactive fluorene dye (RD) and the protonated fluorene dye, the fluorescence emitter (FE);

(m) measuring ~~intensity values of each of the~~ fluorescent ~~values~~ output signals each lasting for approximately 5 nanoseconds at 650 nm wavelength for the protonated fluorene dye (FE) and at approximately 530nm wavelength for the reactive dye (RD); and

(n) reading ~~differences in the intensity values to determine data in the data storage voxel~~ three pieces (ternary) rather than 2 pieces (binary) of information from each bit giving an advantage of 3/2 or approximately 50% more data storage from the same number of bits over a binary system.

Claim 3 (Currently Amended). A 3-bit, 0-1-2 ternary encoding scheme for WORM (Write Once Read Many Times) optical data storage on a compact disc (CD) or digital video disc (DVD) with two-photon fluorescent readout comprising:

(a) a multiple layered data storage medium composed of a transparent polymer selected from at least one of polystyrene, polymethylmethacrylate (PMMA) and polycarbonate, impregnated with a photo-acid generator and a stable reactive fluorene dye; ~~and,~~

(b) the multiple layered storage medium having been subjected to high intensity short pulses from a focused near infrared tunable Ti:Sapphire laser to record data, whereby the photo-acid generator absorbs the high intensity short pulses, undergoes two-photon absorption and generates a proton ion (H^+) that is donated to the reactive fluorene dye causing the negative counter-ion from the photo-acid generator and the positive ion reactive fluorene dye to form a data storage voxel (volume pixel) with 0-1-2 ternary (3-bit) encoded data in a data storage medium containing a photo-acid generator (PAG), a reactive fluorene dye (RD), and a protonated fluorene dye, the fluorescence emitter (FE); and

(c) a two-photon infrared laser light pulse of approximately 10μs with approximately 800 nm wavelength laser light to excite the reactive fluorene dye (RD) and the fluorescence emitter (FE) causing each to provide[[s]] fluorescent values at 530 nm wavelength and 650 nm wavelength, respectively, resulting in data readout.

Claim 4 (Currently Amended). A method for making a multilayer data storage system using a 0-1-2 ternary encoding scheme for WORM (Write Once Read Many Times) optical data storage on a compact disc (CD) or digital video disc (DVD) based on two-photon induced recording and two-photon fluorescence readout technology comprising the steps of:

(a) creating a multilayered optical disk as the data storage medium cast from a transparent polymer selected from at least one of polystyrene, polymethylmethacrylate (PMMA) and polycarbonate impregnated with a photosensitive Photo-Acid Generator (PAG) and a reactive fluorene dye (RD);

(b) focusing a near infra-red tunable Ti:Sapphire laser beam into said storage medium with high intensity short pulses at 730nm wavelength causing the photo-acid generator to

undergo two-photon absorption and generate a proton ion (H^+) that is donated to the reactive fluorene dye causing the formation of a data storage voxel with 0-1-2 ternary (3-bit) encoded data in a data storage medium containing a photo-acid generator (PAG), a reactive fluorene dye (RD), and a protonated fluorene dye, the fluorescence emitter (FE) for the data writing process;

(c) forming a multiplicity of stable balanced ion pairs from the negative counter-ion, PAG^-, and the positive $RD^+[[.]]$, to make volume pixels corresponding to the encoded data in the storage medium;

(d) retuning said near-IR Ti:Sapphire laser for data reading by stimulating the fluorescence of the fluorescence emitter (FE) and reactive fluorene dye (RD) with a two-photon infrared laser light pulse of approximately 10 μs and an approximately 800 nm infrared light wavelength; and,

(e) reading and comparing the fluorescence output signals of the FE and RD, whereby a 3-bit, 0-1-2 ternary data-encoding scheme is realized.

Claim 5 (Canceled)

Claim 6 (Previously Presented). The multilayer data storage system based on two-photon induced recording and two-photon fluorescence readout technology according to claim 4 wherein the reactive dye (RD) is a stable fluorene dye.

Claim 7 (Canceled).

Claim 8 (Currently amended). The multilayer data storage system based on two-photon induced recording and two-photon fluorescence readout technology according to claim 4 wherein the ~~multiplayer~~ multilayer is at least approximately 5 layers.

Claim 9 (Canceled).

Claim 10 (Currently Amended). A multilayer data storage system using a 3-bit, 0-1-2 ternary encoding scheme for WORM (Write Once Read Many Times) optical data storage on a compact disc (CD) or digital video disc (DVD) based on two-photon induced recording and two-photon fluorescence readout technology comprising:

(a) a multilayered optical disk as the data storage medium cast from a transparent polymer selected from at least one of polystyrene, polymethylmethacrylate (PMMA) and polycarbonate impregnated with a photosensitive Photo-Acid Generator (PAG) and a reactive fluorene dye (RD);

(b) a near infra-red tunable Ti:Sapphire laser which can be focused into said storage medium for the data writing process causing the photo-acid generator (PAG) to undergo two-photon absorption and generate a proton ion (H^+) that is donated to the reactive fluorene dye causing the formation of a data storage voxel (volume pixel) with 0-1-2 ternary (3-bit) encoded data in a data storage medium containing a photo-acid generator (PAG), a reactive fluorene dye (RD), and a protonated fluorene dye, the fluorescence emitter (FE);

(c) ~~volume pixels corresponding to the encoded data in the medium (d)~~ means for retuning said near-IR laser and thereby stimulating the fluorescence of the fluorescence emitter (FE) and the reactive fluorene dye (RD) with a two-photon infrared laser light pulse

of approximately 10 μs with approximately 800 nm wavelength laser light for data reading; and[[,]]

~~(e)~~ (d) means for reading and comparing the fluorescence output signals of the FE and RD, whereby a 3-bit, 0-1-2 ternary data-encoding scheme is provided.

Claim 11 (Original). A multilayer data storage system according to claim 10 wherein the data storage medium has at least 5 layers.

Claim 12 (Original). A multilayer data storage system according to claim 11 wherein the data storage medium has approximately 5 to approximately 50 layers.

Claim 13 (Original). A multilayer data storage system according to claim 10 wherein the data storage medium has approximately 59 to approximately 200 layers.

Claim 14 (Original). A multilayer data storage system according to claim 11 wherein the data storage medium has approximately 300 to approximately 500 layers.

Claims 15 - 17 (Canceled).

Claim 18 (Currently Amended). A 3-bit, 0-1-2 ternary WORM (Write Once Read Many Times) optical data storage device comprising a multilayer data disk storage system for compact disc (CD) or digital video disc (DVD) ~~CD/DVD~~ system composed of at least approximately five layers of an optically transparent polymer selected from at least one of

polystyrene, polymethylmethacrylate (PPMA) and polycarbonate, impregnated with a photo-acid generator and a reactive fluorene dye.

Claim 19 (Currently Amended). ~~A~~ The 3-bit, 0-1-2 ternary WORM (Write Once Read Many Times) optical data storage device according to claim 18 wherein the data storage medium has from approximately five to approximately fifty layers of said transparent impregnated polymer.

Claim 20 (Currently Amended). ~~A~~ The 3-bit, 0-1-2 ternary WORM (Write Once Read Many Times) optical data storage device according to claim 18 wherein the data storage medium has from approximately fifty to approximately [[tow]] two hundred layers of said optically transparent impregnated polymer.

Claim 21 (Currently Amended). ~~A~~ The 3-bit, 0-1-2 ternary WORM (Write Once Read Many Times) optical data storage device according to claim 18wherein the data storage medium has from approximately three hundred to approximately five hundred layers of said optically transparent impregnated polymer.

Claim 22 (Currently Amended). ~~A~~ The 3-bit, 0-1-2 ternary WORM (Write Once Read Many Times) optical data storage device according to claim 18 wherein the bit length is approximately 0.576μ.